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Disaster Preparedness among Healthcare Workers: An Ecohumanist Approach to Education and Training

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Abstract

Background: Disaster preparedness is critical in ensuring that healthcare workers (HCWs) are adequately prepared to respond to emergencies. This study explores HCWs' disaster preparedness knowledge, skills, and educational needs from an ecohumanist perspective. It emphasizes sustainability, interdisciplinary learning, and community-based responses. Objective: The study assesses the disaster preparedness levels of HCWs and identifies gaps in their education and training. Methods: A cross-sectional survey was conducted with 214 valid responses. A structured questionnaire assessed disaster preparedness knowledge, skills, and educational needs, analyzed using descriptive statistics and inferential methods. Results: The findings suggest moderate to high levels of preparedness among HCWs, with gaps in areas such as disaster research knowledge and specialized training. A high need for community resource awareness was identified. Conclusion: The study highlights the importance of improving HCWs' disaster preparedness through ecohumanist-based training programs that focus on sustainability, collaboration, and community resilience...

Keywords: *Disaster Preparedness, Healthcare Workers, Ecohumanism, Education, Emergency Response.*

Introduction

Natural catastrophes or anthropogenic crises jeopardize public health and need prompt, coordinated, and effective responses from emergency medical services. Emergency Medical Services (EMS) play a crucial role in disaster management by providing first medical assistance, triaging patients, and arranging for casualties who cannot be treated on-site. Consequently, EMS systems are expected to react to such occurrences well-prepared to manage high-stress and high-risk environments (Clements & Casani, 2016). Crisis preparedness encompasses the preparation of EMS teams and their capacity to operate effectively in a catastrophe context, necessitating more than just personnel and equipment. Disaster preparedness is essential for ensuring that EMS crews can promptly provide services during a catastrophe. It signifies preparedness with unobstructed operational directives, robust supplies, and personnel on standby. Emergency Medical Services specialists have determined that healthcare companies engaging in regular catastrophe exercises and rehearsals exhibit superior performance during real disasters compared to those who do not. Wolf-Fordham (2020) demonstrates that EMS's catastrophe preparation must include collaboration with other emergency services, such as fire departments, police, and local medical facilities. Enhanced structure and dedication in planning fosters consensus across services about resources, communication, and coordination.

Before catastrophes, formulating diverse scenarios and solutions, such as establishing triage protocols and constructing field hospitals alongside mass casualty drills, may save response time and improve patient outcomes. Hamilton et al. (2022) reported in the same year as the tragedy that an EMS team that is well-prepared may either assist lessen the impact of the disaster on those impacted or, thanks to early medical intervention, save lives. Nonetheless, challenges persist over insufficient training and a lack of specialized personnel and infrastructure to meet expectations during real disasters, especially for emergency medical services in lower-income and rural areas. In these regions, the EMS crews may lack awareness of mass fatality assessment or the implementation of a field healthcare facility, which requires time.

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Cross-sectional research conducted by Nishiyama et al. (2024) showed that rural EMS in Japan lacked sufficient training in contemporary disaster response technology, resulting in ineffective disaster response and increased mortality. This may be due to the exorbitant costs associated with acquiring these devices; however, even when economical options are available, their application in pre-hospital environments is frequently restricted. The lack of portable defibrillators or advanced airway management tools underscores this unfortunate reality. Consequently, during large-scale catastrophes, EMS workers in these regions may be impeded by insufficient responses to emergencies; there is a need for greater expenditure on resources and education to strengthen disaster preparation. It underscores discrepancies, revealing worse results for rural EMS, especially in resource accessibility and service efficacy. Increased investment in resources and instruction is essential for resolving these deficiencies (Martinez et al., 2019).

The identification of Coronavirus was one of the health disaster incidences that appeared in the Kingdom of Saudi Arabia (Aly et al., 2017). Disasters—whether natural, biological, or man-made—pose significant challenges to healthcare systems and require rapid, well-coordinated responses from healthcare workers (HCWs). Khan et al. (2018) indicated that establishing proper response plans to disasters had to be founded on the shortcomings of the previously used approaches and thus must seek to seal the experienced deficiencies.

Ensuring that HCWs are adequately trained in disaster preparedness is crucial for mitigating the impact of emergencies and protecting both human and environmental health. However, studies indicate that many HCWs lack the necessary knowledge and skills to respond effectively to crises (Tahir, Shah, &Zaman, 2018). The approach integrates the ethical, social, and environmental dimensions of disaster preparedness. It emphasizes sustainability, interdisciplinary collaboration, and community engagement in disaster response planning. This study explores HCWs' disaster preparedness knowledge, skills, and educational needs from an eco-humanist perspective. It emphasizes sustainability, interdisciplinary learning, and community-based responses.

Methodology

A cross-sectional survey was conducted among HCWs to evaluate their knowledge, skills, and educational needs regarding disaster preparedness. A structured questionnaire was used, and a total of 214 valid responses were analyzed after data cleaning. The questionnaire included: Demographic information (age, gender, education, profession, work experience), Disaster preparedness knowledge and skills (assessed using a 7-point Likert scale), and Educational and training needs related to disaster response. Normality testing was performed before conducting multivariate analyses, ensuring that the data met statistical assumptions.

Results

A large sample of 415 respondents was initially targeted, with 255 responses received, resulting in a response rate of 61.74%. However, 39 questionnaires were incomplete and were excluded from the analysis. After data cleaning, a final sample of 214 valid responses was used for analysis.

Respondents' Demographic Profile

Variable	Level	Frequency	Percent
Age	26-30	21	9.8
	31-35	104	48.6
	36-40	71	33.2
	More than 40	18	8.4
Sex	Female	98	45.8
	Male	116	54.2
Nationality	Saudi	197	92.1

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	non-Saudi	17	7.9
Education	Diploma	38	17.8
	Bachelor	102	47.7
	Master	69	32.2
	PhD	5	2.3
Years of experience	0 to 2 years	5	2.3
	3 to 5 years	82	38.3
	6 to 15 years	77	36
	More than 15 years	50	23.4
Profession	Other HCW	52	24.3
	Nurse	162	75.7

Descriptive Results of Knowledge of Disaster Preparedness

To analyze this part of the questionnaire, descriptive statistics such as mean (M), standard deviations (SD) were employed. The results showed that the highest mean belonging to, the "I am aware of classes about disaster preparedness and management that are offered, for example at my workplace, the university or community about Corona virus out-breaking." with (M=5.91 SD=1.13) followed by "I have a list of contacts in the medical or health community in which I practice I know referral contacts in case of a disaster situation (for example, health department) when Corona virus out-breaking." with (M=5.54, SD=1.38). Among related items to of knowledge of disaster preparedness the lowest mean score was observed for "I know where to find relevant research or information related to disaster preparedness and management of Corona virus outbreaking to fill in gaps in my knowledge." with (M=4.40, SD=1.83). The overall mean for knowledge was M=5.41, which was higher than the median of scale (4) which revealed an almost moderate level for this variable.

Descriptive Statistics Related to Knowledge of Disaster Preparedness

Item	Mean	SD	Level
1- I participate in disaster drills or exercises about out-breaking of Corona virus at my workplace (clinic, hospital, etc.) on a regular basis.	5.29	1.77	High
2- I have participated in emergency plan drafting and emergency planning for disaster situations in my community including Corona virus out-breaking.	4.92	1.45	Moderate
3- I know who to contact (chain of command) in disaster situations in my community	4.79	1.48	Moderate
4- I participate in one of the following educational activities on a regular basis: continuing education classes, seminars or conferences dealing with disaster preparedness.	5.09	1.16	High
5- I read journal articles related to disaster preparedness including Corona virus out-breaking.	5.11	1.13	High
6- I am aware of classes about disaster preparedness and management that are offered, for example at my workplace, the university or the community about Coronavirus out-breaking	5.91	1.13	High

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7- I would be interested in educational classes on disaster preparedness that relate specifically to my community situation and Coronavirus out-breaking.	5.20	1.15	High
8- I find that the research literature on disaster preparedness and Corona out breaking, and management is easily accessible.	5.36	1.313	High
9- I find that the research literature on disaster preparedness and Coronavirus out-breaking is understandable	5.31	1.51	High
10- Finding relevant information about disaster preparedness and Coronavirus out-breaking related to my community needs is an obstacle to my level of preparedness.	4.91	1.27	Moderate
11- I know where to find relevant research or information related to disaster preparedness and management of Corona virus outbreak to fill in gaps in my knowledge.	4.40	1.83	Moderate
12- I have a list of contacts in the medical or health community in which I practice I know referral contacts in case of a disaster situation (for example, the health department) when Coronavirus out-breaking.	5.54	1.38	High
13- In case of a disaster and Coronavirus outbreak situation I think that there is sufficient support from local officials on the county, regional, or government level.	5.07	1.45	High
Total	**5.41**	**0.94**	High

Descriptive Results of Skill of Disaster Preparedness

Skill as the second subscale of disaster preparedness evaluation was measured by 11 indicators and each statement was based on a 7-point Likert scale (ranging from 1= "Strongly disagree" to 7= "Strongly agree"). With regards to the skill of disaster preparedness, the statement "I participate/have participated in creating new guidelines, emergency plans, or lobbying for improvements on the local or national level of Coronavirus out-breaking." with (M=5.97, SD=1.21) followed by "I would be considered a key leadership figure in my community in a disaster situation including Coronavirus out-breaking." with (M=5.86, SD=1.14) and the lowest mean belongs to "I consider myself prepared for the management of disasters including Corona virus out-breaking." with (M=5.59, SD=1.22). The overall mean of skill of disaster preparedness was M=5.70 which was higher than the median of scale (4), which revealed an almost high level for this component.

Descriptive Statistics Related to Skill of Disaster Preparedness

Item	Mean	SD	Level
1- I consider myself prepared for the management of disasters including Coronavirus out-breaking.	5.59	1.22	High
2- I participate/have participated in creating new guidelines, emergency plans, or lobbying for improvements on the local or national level of Corona virus out-breaking.	5.97	1.21	High
3- I would be considered a key leadership figure in my community in a disaster situation including Corona virus out-breaking.	5.86	1.14	High
4- I am aware of what potential risks in my community are including Coronavirus out-breaking.	5.66	0.86	High
5- In case of Coronavirus out-breaking, I know how to use personal protective equipment.	5.75	1.05	High
6- In case of a Coronavirus out-breaking I know how to execute decontamination procedures.	5.61	1.03	High

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7- In the case of Corona virus outbreak I know how to perform isolation procedures so that I minimize the risks of community exposure.	5.68	1.11	High
8- I am familiar with the local emergency response system for Coronavirus out-breaking disasters.	5.79	0.75	High
9- I am familiar with accepted triage principles used in disaster situations of Coronavirus out-breaking.	5.72	0.85	High
10- I have personal/family emergency plans in place for disaster situations including Coronavirus out-breaking.	5.79	0.91	High
11- I have an agreement with loved ones and family members on how to execute our personal/family emergency plan when Coronavirus out-breaking.	5.64	0.80	High
Total	**5.70**	**0.63**	High

Descriptive Results of Disaster Preparedness

To analyze this part of the questionnaire, descriptive statistics such as mean (M), and standard deviations (SD) were employed. The results showed that the highest mean belonged to, the "I am familiar with the main groups of infectious diseases their signs and symptoms, and effective treatments." with (M=5.96, SD=0.872) followed by "I would feel confident providing patient education on stress and abnormal functioning related to Corona virus outbreaking." with (M=5.88, SD=0.956). Among related items to knowledge of disaster preparedness, the lowest mean score was observed for "I participate in peer evaluation of skills on disaster preparedness and response to Corona virus outbreaking." with (M=4.91, S. D=1.39). The overall mean for knowledge was M=5.45, which was higher than the median scale (4) which revealed an almost moderate level for this variable.

Descriptive Statistics Related to Disaster Preparedness

Item	Mean	SD	Level
1- I know the limits of my knowledge, skills, and authority as a health care provider to act in disaster situations, and I would know when I exceed them.	5.76	0.86	High
2- I can identify possible indicators of mass exposure to Corona virus evidenced by a clustering of patients with similar symptoms.	5.61	0.80	High
3- I can manage the common symptoms and reactions of disaster survivors from Corona virus that are of affective, behavioral, cognitive, and physical nature.	5.51	1.12	High
4- I am familiar with psychological interventions, behavioral therapy, cognitive strategies, support groups, and incident debriefing for patients who experience emotional or physical trauma.	5.44	0.99	High
5- I am able to describe my role in the response phase of the Coronavirus out-breaking disaster in the context of my workplace, the general public, media, and personal contacts.	5.66	0.87	High
6- I am familiar with the main groups of infectious diseases their signs and symptoms, and effective treatments.	5.96	0.80	High
7- I feel confident recognizing differences in health assessments indicating potential exposure to infectious diseases	5.79	0.80	High
8- As a health care provider, I would feel confident in my abilities as a direct care provider and first	5.49	1.27	High

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responder in disaster situations in case of Corona virus out-breaking.			
9- As a health care provider, I would feel confident as a manager or coordinator to manage the virus	5.5	1.06	High
10- As a health care provider, I would feel reasonably confident in my abilities to be a member of a decontamination team.	5.52	0.95	High
11- In case of Coronavirus outbreak I know how to perform focused health history and assessment, specific to the biological or chemical agents that are used.	5.56	1.25	High
12- As a health care provider, I feel reasonably confident that I can care for patients independently in a disaster situation.	5.32	1.22	High
13- I am familiar with the organizational logistics and roles among local and national agencies in disaster response situations.	5.13	1.39	High
14- I would feel confident implementing emergency plans, evacuation procedures, and similar functions.	5.61	1.20	High
15- I would feel confident providing patient education on stress and abnormal functioning related to Corona virus out-breaking	5.88	0.96	High
16- I would feel confident providing education on coping skills and training for patients who experience Corona virus and other situations, so they are able to manage themselves.	5.35	1.14	High
17- I am able to differentiate the signs and symptoms of infectious diseases including Corona virus out-breaking	5.17	1.39	High
18- I am familiar with what the scope of my role as a health-care provider in a preparedness-disaster situation including management of Corona virus.	5.09	1.36	High
19- I participate in peer evaluation of skills on disaster preparedness and response to Corona virus out-breaking.	4.91	1.39	Moderate
20- I am familiar with how to perform focused health assessment for preparedness disaster events including out-breaking of Corona virus.	4.99	1.28	High
21- I feel confident managing (caring, evaluating) emotional outcomes following Corona out-breaking virus disaster or in a multi-disciplinary way such as referrals, and follow-ups and I know what to expect in ensuing months.	5.11	1.17	High
Total	**5.45**	**0.74**	High

Level of Educational Needs

The educational needs which were measured by seven indicators and each statement was based on a 7-point Likert scale (ranging from 1= "Strongly disagree" to 7= "Strongly agree"). With regards to educational needs, the statement "Resources in my community, such as agencies for referral health departments, emergency contacts." with (M=6.15, SD=1.39) recorded the highest mean score followed by "Focused assessment, debriefing strategies, and behavioral, cognitive or medication therapy about Corona virus out-breaking." with (M=5.88, SD=0.98) and the lowest mean belongs to "Differential diagnosis and

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treatments of Coronavirus out-breaking." with (M=4.91, SD=1.87). The total means of educational needs was M=5.75 which was higher than the median of scale (4), which revealed an almost high level for this component.

Descriptive Statistics Related to Educational Needs

Item	Mean	SD	Level
1- My role (my scope of practice, skills) as a healthcare provider in a disaster situation including Coronavirus out-breaking.	5.88	0.98	High
2- What potential risks exist in my community in case of Corona virus out-breaking?	6.04	0.97	High
3- The ways to identify Coronavirus out-breaking and their signs and symptoms.	5.56	1.11	High
4- Differential diagnosis and treatments of Coronavirus out-breaking.	4.91	1.87	High
5- Resources in my community, such as agencies for referral health departments, and emergency contacts.	6.15	1.39	High
6- Focused assessment, debriefing strategies, and behavioral, cognitive, or medication therapy about Coronavirus out-breaking.	5.97	1.09	High
7- I feel well-prepared for the Coronavirus outbreak.	5.71	1.09	High
Total	**5.75**	**0.822**	High

Discussion

This study's results provide a detailed comprehension of catastrophe preparation among healthcare personnel in the Salah-Alddin Governorate. The data reveals that healthcare workers often exhibit moderate to high levels of readiness; yet it is essential to acknowledge the significant deficiencies that remain, especially in specialized training and research expertise.

The findings unequivocally demonstrate that healthcare workers exhibit a noteworthy degree of readiness for emergency scenarios, indicating an increasing recognition of the significance of disaster response. Nevertheless, this readiness is not evenly distributed across all skills. Numerous individuals demonstrate confidence in their emergency planning abilities; however, this assurance is relatively superficial when evaluated against their real knowledge and competencies. This finding corresponds with other studies, like the study conducted by Berger et al. (2016), which emphasized comparable inconsistencies between self-reported confidence and real readiness levels among healthcare workers in emergencies.

The observed moderate to high levels of preparation in this research are promising, given the rising frequency and intensity of worldwide catastrophes. However, the reported deficiencies, especially in specialized training and knowledge of disaster-related research resources, are concerning. The research conducted by Khan et al. (2018) underscores the need for continuous education and training customized to the particular sorts of catastrophes that healthcare workers may face. This indicates that while general readiness is vital, specialist training in triage procedures, mental health first aid, and mass casualty event management is necessary for efficient disaster response.

The recognized deficiencies in specialized training are very concerning. Effective disaster response requires not just broad readiness, but also specialized abilities adapted to the distinct obstacles presented by different kinds of catastrophes. Lack of specialized training may result in insufficient responses, thereby worsening the effects of a catastrophe on impacted communities. This corresponds with the results of Nishiyama et al. (2024), which indicated that rural emergency medical services (EMS) in Japan were not trained in modern disaster response tactics, resulting in poor disaster management and elevated fatality rates.

To rectify these deficiencies, it is essential to devise and execute extensive training programs tailored to the particular requirements of healthcare workers in catastrophe scenarios. These programs must include

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simulated exercises, scenario-based learning, and multidisciplinary teamwork to enhance comprehension of disaster management. Furthermore, continuous training should be mandated, enabling healthcare workers to remain informed about best practices and developing trends in disaster preparation. Research by Cao et al. (2018) and Canton (2019) endorses this strategy, promoting ongoing education and training to improve healthcare workers' competencies and confidence in managing crises.

The study underscores a troubling deficiency in healthcare workers' knowledge of disaster-related research sources. This gap is crucial since research is essential for informing practice and directing effective responses in crises. Healthcare workers must be proficient in accessing and interpreting relevant research results to implement evidence-based practices in their roles. This need reflects the views articulated by Chen & Yu (2016), who underscored the significance of including research literacy in disaster preparation training.

To foster a research-oriented attitude among healthcare workers, educational institutions and healthcare organizations must encourage a culture of inquiry. This may be accomplished via workshops, seminars, and access to databases containing current research on catastrophe planning and response. Motivating healthcare workers to participate in research may enable them to make educated choices that improve patient outcomes in times of crisis. Prior study indicates that healthcare workers involved in continuous research are more adept at modifying their methods in response to new data, resulting in enhanced patient care (Talal Qadah, 2020).

Incorporating multidisciplinary education into disaster training programs may markedly improve the readiness of healthcare workers. Disasters often need synchronized efforts from several sectors, including healthcare, emergency services, and community groups. By promoting cooperation across different sectors, healthcare workers may get insights into the many tasks and duties associated with disaster response.

Studies indicate that multidisciplinary training enhances communication and cooperation in crises, hence boosting overall responses (Wolf-Fordham, 2020). Collaborative drills involving fire departments, law enforcement, and local medical institutions may provide healthcare workers with hands-on experience in inter-agency collaboration, aiding in the identification of possible issues related to resource distribution and communication. The research conducted by Hamilton et al. (2022) corroborates this, demonstrating that successful disaster response necessitates a collaborative endeavor across several sectors to guarantee prompt and efficient responses.

An eco-friendly strategy for disaster preparation is crucial for enabling healthcare systems to react efficiently to calamities while safeguarding human welfare and the environment. The results indicate that healthcare workers should get training in sustainable approaches that emphasize both emergency response and long-term community resilience. This corresponds with the viewpoint of Khan et al. (2018), who promoted disaster preparation strategies that include environmental and ethical factors.

Ethical readiness is paramount; healthcare workers must be educated to address the moral difficulties that may emerge during catastrophe scenarios. Training programs must focus on resource allocation, care priority, and the psychological effects of crises on responders and victims. Prior studies have shown that integrating ethical issues into disaster training may improve healthcare workers' capacity to make challenging judgments under duress (Talal Qadah, 2020).

Adopting a community-focused strategy for disaster planning may significantly improve healthcare resilience. This approach acknowledges that communities are essential to the disaster response process and that their participation may provide more effective results. By including community members in disaster planning and response initiatives, healthcare workers may cultivate a feeling of ownership and cooperation that fortifies community bonds and improves resilience.

Community participation may manifest in many ways, such as educational initiatives that educate citizens on disaster preparation measures, the formation of local reaction teams, and collaborations with community groups. By cultivating robust connections with community stakeholders, healthcare workers may customize their responses to align with the distinct needs and resources of the community, thus enhancing the efficacy of disaster management. Previous research indicates that community engagement in disaster planning significantly improves the efficiency of response activities (Imperiale & Vanclay, 2019).

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Effective communication is essential for effective catastrophe preparation and response. The research highlights the need for enhanced communication techniques to ensure healthcare workers are aware of the essential elements of disaster management. This encompasses both the dissemination of information on response protocols and the engagement of healthcare workers in dialogues concerning lessons derived from prior catastrophes.

Healthcare institutions need to allocate resources toward communication training that prioritizes clarity, empathy, and active listening. Equipping healthcare workers with excellent communication skills enables them to connect more effectively with patients and community members during emergencies, resolving concerns and disseminating essential information. Prior studies indicate that good communication during catastrophes may significantly influence patient outcomes and enhance community resilience (Wolf-Fordham, 2020).

Conclusion

This research offers significant insights into the emergency preparation levels of healthcare personnel in Salah-Alddin Governorate. Despite clear moderate to high readiness levels, substantial deficiencies persist in specialized training, research acumen, and community involvement. It is imperative to address these deficiencies via extensive training programs, multidisciplinary teamwork, and an emphasis on sustainability and ethical readiness to improve healthcare resilience.

Future initiatives must emphasize the creation of eco-humanist training frameworks that include the ethical, social, and environmental aspects of disaster preparation. By cultivating a culture of perpetual learning and community engagement, healthcare systems may enhance the preparedness of healthcare workers to react adeptly to crises, hence protecting public health and welfare.

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